

I claim:

1. A system for detection of railroad wheel defects comprising remote rail defect monitors installed in rails over which the wheels travel, and means obtaining wheel identification and defect information from the monitors.
2. A system per claim 1 in which said remote rail defect monitors comprise:
  - first and second acoustically isolated rail sections, each equipped with an acoustical/vibration sensor, two for each rail, to define successive remote monitoring locations, said sensors being operative respond to sounds/vibrations generated when train wheels are rolling on said rail segments.
  - said sensors being operative to generate specific electrical signals representing the nature and extent of said defects said specific electrical signals differing in their parameters from the electrical signals generated when said wheels roll over said rail sections are free from any defects;
  - means to amplify electrical signals generated by said sensors in response to sounds and vibrations made train wheels rolling over said rails;
  - first computing means to analyze said amplified electrical signals by transforming said signals from time into frequency domain and generating a signal intensity vs. frequency spectra;

second computing means to accept said spectra and compare said spectra to first reference spectra stored in said computing means to indicate the absence/presence of the wheel defects;  
means to determine the location of any detected defect in said wheels;

3. The system per claim 2 comprising means for transmitting the collected data from said computing means on the nature, the extent and the location of said defects;  
means for uniquely identifying the identity of the remote defect monitoring location, when said defect is first detected.
4. A system per claim 1 in which said central monitoring station has means which receive the information from said remote rail defect monitors and generates reports and warnings related to the condition of said wheels.
5. A system per claim 2, in which the first computing means uses a fast Fourier transform to perform said conversion of said signals from time domain to frequency domain, thus generating sound/vibrations intensity vs. frequency spectra.
6. A system per claim 5 in which said second computing means are used to accept said spectra, compute the differences of said spectra to said first stored reference spectra and identify the nature and the extent of a defect in said wheels by

comparing said difference with stored second reference spectra, said stored second reference spectra being representative of said defects in said wheels.

7. A system per claim 2 in which the functions of said first computing means is incorporated into said second computing means.
8. A system per claim 2 in which said sensors are stationary and are attached to said rails.
9. A system per claim 2 in which said first and second sensors include means for detecting the instant when said wheels pass over the location of said sensors.
10. A system per claim 9 in which said means for detecting the instant when said wheels pass the location of said sensors include strain gauges.
11. A system per claim 9 in which said means for detecting the instant when said wheels pass over the location of said sensors include pressure sensors.
12. A system per claim 9 in which said means for detecting the instant when said wheels pass the location of said sensors include magnetic sensors.
13. A system per claim 8 wherein the means are provided, responsive to said sensors for counting the number of wheels passing over said rail sections.

14. A system per claim 3 in which said transmitting means transmit said collected data pertaining to detected defects to said central monitoring station.
15. A system per claim 2, which includes means responsive to outputs from said sensors for generating and storing electrical energy.
16. A system per claim 15, in which said outputs are electrical signals generated in response to said sounds and vibrations to generate electrical current, said current stored as an electrical charge in a storage battery.
17. A system per claim 2 in which said rail sections are inserted into said rails and joined to said rails by means of a channel structures.
18. A system per claim 17 in which said channel structures contain sound isolating material that prevents the sounds from adjoining rail to be passed into said rail sections.
19. A system per claim 18 in which said channel structures are equipped with said sensors.